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SR-L1-00301
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NASA-CR-161060

**A Joint Program for
Agriculture and
Resources Inventory
Surveys Through
Aerospace
Remote Sensing**

Supporting Research

June 1981

E82-10085

"AS-BUILT" DESIGN SPECIFICATION FOR UNIV4VEC CR-161060

M. A. Tompkins
C. A. Sivillo

(E82-10085) AS-BUILT DESIGN SPECIFICATION
FOR UNIV4VEC (Lockheed Engineering and
Management) 32 p HC A03/MF A01 CSCL 02C

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Houston, Texas 77058

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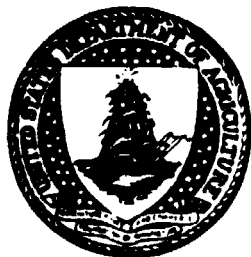
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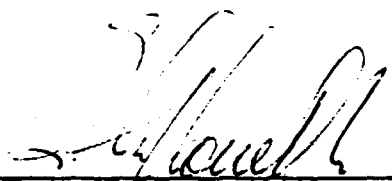
"AS-BUILT" DESIGN SPECIFICATION
FOR UNIV4VEC

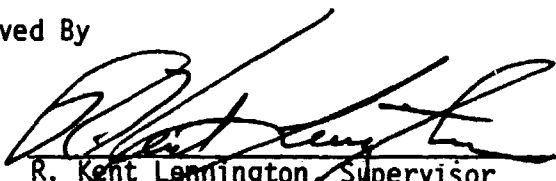
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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
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16. Abstract This document is the "As-Built" Design Specification for the UNIV4VEC Program is part of the CLASFYG package. This program reads a CLASFYG vector parameter file and converts it to a four channel universal formatted file.		
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UNIV4VEC PROGRAM

1.0 SCOPE

This document describes the UNIV4VEC Program which is one of the BADHWAR SYSTEM programs. Included in this system are the CLASFYT, CLASFYG, PARPLT, PARHIS, PARCLAS and MISMAP programs.

The UNIV4VEC program reads a CLASFYG vector parameter file and converts it to a four channel universal formatted file. This universal formatted file is primarily used as input to the CLASSY processor.

2.0 APPLICABLE DOCUMENTS

The following documents form a part of this specification:

AD 63-3308-03 Transferring Badhwar Software.

AD NAS 9-15200 Technical Memorandum Format Specifications for LACIE (Phase III) and Accuracy Assessment Computer Data Products.

3.0 SYSTEM DESCRIPTION

3.1 SYSTEM FLOWCHART

The system level data flow diagram for the UNIV4VEC Program is depicted in Figure 3.1.1.

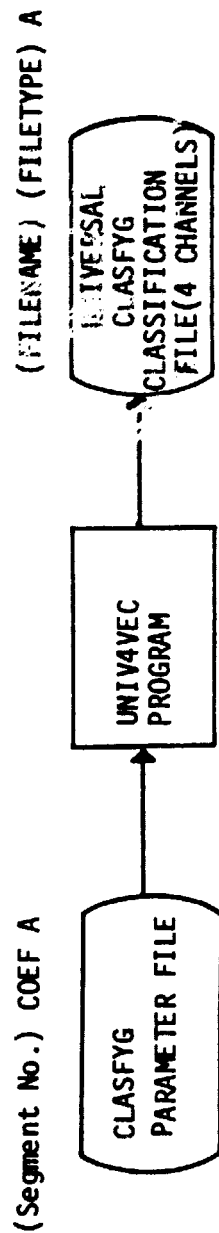


Figure 3.3.1 System level flow diagram for the UNIV4VEC Program.

3.2 HARDWARE DESCRIPTION

The software for the UNIV4VEC Program is operational on the IBM 3031 computer at Purdue, LARS.

3.3 SOFTWARE DESCRIPTION

The UNIV4VEC Program reads a CLASFYG vector parameter file header and sets the appropriate bytes to indicate a four channel universal file with 196 bytes per channel. The data records from the parameter file are read. Each of the pixel vector coefficients within the parameter file are assumed to be within the range 0 to 9999, therefore, all coefficients are divided by forty to insure that the resulting coefficient value is less than 256 and will store in a byte. After division, the element is stored in the output buffer. When all elements in the line are processed, the buffer is written.

3.4 FILE DESCRIPTIONS

3.4.1 INPUT FILE

UNIV4VEC accepts as input, a parameter file output from the CLASFYG Program. This parameter file consists of 118 records. The first record is a header record consisting of 3060 bytes. The header record follows universal format requirements. Records 2-118 contain data records. Each data record consists of 196 pixel vectors. Each pixel vector consists of four coefficients: α , β , t_0 and χ^2 . Each coefficient contains a signed integer value stored in a thirty-two bit full word. (For a complete description of this file see "AS-BUILT" DESIGN SPECIFICATION FOR CLASFYG LEMSCO-16649/JSC-17369).

3.4.2 OUTPUT FILE

The output file is in universal format and contains the following records:

Header Record

The header record contains all information from the CLASFYG header. In addition, the following bytes are assigned so that the resulting header conforms to the universal format standards:

<u>BYTE(S)</u>		<u>CONTENTS (DECIMAL)</u>	<u>DESCRIPTION</u>
81	=	240	First four bits on to indicate four channels
89	=	1	Processing flag
90	=	4	Number of channels per physical record
91	=	8	Number of bits in pixel (always = 8)
92-93	=	1	Start of the video data (always = 1)
96-97	=	196	Number of pixels per scan line
100-101	=	900	Physical record size in bytes (multiple of 180 bytes)
104	=	1	Number of records in a data set
105-106	=	70	Length of ancillary block
108-109	=	1	Beginning pixel within the channel
110-111	=	196	Last pixel within the channel
753	=	32	Word size of machine in bits
1778	=	1	Number of data sets in record
1786	=	4	Number of channels within the first physical record of the data set

Data Records

There are 117 four channel data records of length 900 eight bit-bytes. Each data record contains seventy-two bytes of ancillary data followed by 196 bytes representing the α coefficient, 196 bytes representing the β coefficient, 196 bytes representing the t_0 coefficient, and 196 bytes representing the χ^2 coefficient. The remaining forty-four bytes are zero filled to complete the 900 bytes. All coefficients from the parameter file are divided by forty to insure that the resulting number will store in a byte.

(For a complete description of the universal file format see Earth Resources Data Format Book, Volume 1, PHD-TR543.

3.5 SOFTWARE DESCRIPTION

3.5.1 UNIV4VEC

Purpose

The UNIV4VEC Program reformats a universal file from a CLASFYG vector file.

Linkages

None.

Interface

Calling sequence:

Not applicable. (UNIV4VEC EXEC which can be used to load and execute UNIV4VEC is described in Section 4.0).

Calling sequence parameters:

Not applicable.

Function value:

Not applicable.

Labeled common parameters:

None.

Blank Common parameters:

None.

Inputs

<u>Unit</u>	<u>Type</u>	<u>Description</u>
10	Sequential data	Input classification file in vector form (See Section 3.4.1).

Output

<u>Unit</u>	<u>Type</u>	<u>Description</u>
5	Terminal	Report
29	Sequential data; Disk	Output classification file in universal format. (See Section 3.4.2)

Storage Requirement

Not applicable.

Description

The UNIV4VEC Program reads a CLASFYG vector parameter file header and sets the appropriate bytes to indicate a four channel universal file with 196 bytes per channel. The data records from the parameter file are read and each pixel vector coefficient is divided by forty. This insures that each coefficient value is less than 255 and will store in a byte. After division, the element is stored in the output buffer. When all elements in the line are processed, the buffer is written.

Flowchart

Not applicable.

Listing

Not applicable.

3.5.2 PROGRAM CLSRCL

Purpose

CLSRCL reads information necessary to define (FILEDEF) the classification file for the UNIV4VEC program.

Linkages

CLSRCL is executed by UNIV4VEC EXEC.

Interface

None.

Inputs

<u>Unit</u>	<u>Type</u>	<u>Description</u>
23	Sequential	Unit number associated with classification file and classification file name.

Outputs

None.

Storage requirement

Not applicable.

Description

The CLSRCL subroutine reads from file 23 to recall the classification file name and unit number. If the file is empty, an error message is written and the program terminates. If the file is not empty, the EXEC to FILEDEF (define the file to the system) the classification file is written. This is necessary because of the possibility of the file definition being lost due to a system error on one of the program executions.

Flowchart

Not applicable.

Listing

See Appendix A for routine listing.

4.0 OPERATION

4.1 OPERATING DESCRIPTION

UNIV4VEC is operational on the IBM 3031 computer at LARS, West Lafayette, Indiana.

The UNIV4VEC program is one of the programs of the BADHWAR SYSTEM which includes the programs CLASFYT, CLASFGY, MISMAP, PARPLT, PARHIS, and PARCLS.

4.2 COMMANDS DESCRIPTION

To execute UNIV4VEC, the user enters a series of commands which invoke the JOB CONTROL SOFTWARE. These commands are divided into two classes namely (1) FUNCTION commands and (2) PROGRAM commands. The FUNCTION commands, which perform all the functions except executing the program are reusable; i.e., once they are invoked they remain in effect until reentered. The PROGRAM commands, which execute the program, must be reentered each time the program is to be executed.

The following list gives the commands required to execute the UNIV4VEC program. They are all FUNCTION commands except the PROGRAM command UNIV4VEC. These commands must be given in the listed order.

START

DEFCLAS.....

UNIV4VEC.....

END

The following sections describe each of the commands in detail. Input fields are separated by blanks. If more than one word is required to describe an input field, the descriptive text is enclosed in pointed brackets <>. If an input is optional the field is enclosed in square brackets []. Do not include these explanatory characters <> [] when actually submitting input to the computer. To enter a command the user types one input per defined input field and separates each field with a blank.

4.2.1 START

The START command spools the user's console file. The use of this command, along with the END command, will provide a listing of all information appearing on the user's console file. (If running an interactive job, this is the terminal. If running a batch job, this is a system defined device.) The START command is invoked by the user typing the following:

START

4.2.2 DEFCLAS

The DEFCLAS command defines the input Classification file. The user can use this command to define a Classification file on tape or disk. The DEFCLAS command has the following forms and is invoked by typing one of the following, according to the user's requirement.

If the file is on tape -

DEFCLAS TAPE# FILE# (TAPE DENSITY)

If the file is on disk -

DEFCLAS FILENAME FILETYPE FILEMODE

This command remains in effect for the use of any of the BADHWAR SYSTEM PROGRAM commands and does not have to be reissued unless the user wishes to redefine the input Classification File.

4.2.3 UNIV4VEC

The UNIV4VEC command is a PROGRAM command and is used to invoke the execution of the UNIV4VEC program. This command must not be used unless the DEFCLAS command has been previously issued. The UNIV4VEC command is invoked by the user typing the following:

UNIV4VEC <OUTPUT FILENAME> <OUTPUT FILETYPE>

The output file from the UNIV4VEC program is written on the user A disk under the name specified in the EXEC arguments.

4.2.4 END

This command closes the user's console file and causes a spooled copy to be sent to the HOUSTON printer. This command has no effect if the START command was not previously issued. The END command is invoked by the user typing the following.

END

4.3 OPERATING EXAMPLE

For our example we will assume the following:

The user has executed the CLASFYG program and its output file is named 0123 COEF.

COMMAND	EXPLANATION OR ACTION TAKEN
START	Spool the users console
DEFCLAS 0123 COEF B	Defines a Class file on the users B disk. This data is on a disk which the user has previously attached to his disk using a B mode.
UNIV4VEC 0123 UNIVCOEF	Executes the UNIV4VEC PROGRAM.
END	Closes the user's console file and spools the files to the HOUSTON printer.

APPENDIX A
PROGRAM LISTING

A-4

תשובה לכתב העיתון "הארץ" מיום 17.08.96

APPENDIX B
JOB CONTROL SOFTWARE

PAGE 001

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FILE: FND EXEC H LANS / MICHIGAN UNIVERSITY

CONTROL OFF

END EXEC

PURPOSE

THIS EXEC WILL CLOSE CONSOLE FILE AND PRINT THE FILE

PROCEDURE

SPRINT CONSOLE STOP CLOSE

LFM)

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• SCUMTINL OFF
 • START EXEC
 • -----
 • PURPOSE
 • -----
 • THIS EXEC WILL ALLOW FOR THE TO BE ALL ANSWERS TO THE
 • CONSOLE. THIS IS TO BE THE THE CAPACITY ALL ANSWERS TO THE
 • -----
 • PROCEDEME
 • -----
 • TAB DEV CONS MINSTON
 • SPOR CONS START MINSTON TO JACK
 • LFAT
 • LFMD

FILE: UNIV4VFC EXEC IN LARS / MINNIE UNIVERSITY

CONTROL OFF

UNIV4VFC

HISTORY

CAROL STIVILLO LEMSCU MS/UM/RI CUM

PURPOSE

THIS EXEC EXECUTES THE UNIV4VFC PROGRAM

ARGUMENTS TO THIS EXEC ARE: <INPUT FILETYPE>
<OUTPUT FILENAME>

FILE DEFINITION DESCRIPTION FOR ALL FILES USED IN MAINBODY
PROGRAMS AND EXEC ARE AS FOLLOWS:

UNIT
2-4 MAINBODY SYSTEM
4-9 MAINBODY SYSTEM
10 INPUT CLASSIFICATION FILE IN VECTOR FORM
11-20 MAINBODY SYSTEM
20 OUTPUT CLASSIFICATION FILE IN UNIVERSAL FORM

NOTE: THOSE FILES USED BY MAINBODY SYSTEM CAN BE USED IN THIS
PROGRAM. THIS IS JUST A WARNING THAT THE SYSTEM WILL CHECK BEFORE
NOTING SO IF WE INTENDS TO HAVE A MAINBODY SYSTEM FOR.

EXCEPTION

THE FOLLOWING ERRORS CAUSE IMMEDIATE TERMINATION:

1. INSUFFICIENT PARAMETERS INPUT TO PROGRAM

PROCEDURE

SPACE 1
LTYPE UNIV4VFC A1 A2

CHECK TO SEE IF TEMPORARY FILE IS AVAILABLE

CP QUERY VIRTUAL I/O
IF ANYTHING TO A FILED -YES
LTYPE CLASS FILE NOT SET IN FIRM 1
ACRT 1
-YES

CHECK FOR SUFFICIENT MAIN BODY

IF LTYPE EQ 2 FIRM 1 -YES
LTYPE EXEC NEEDS AN FIRM 1 IN FILE AND NOT FILETYPE.
ACRT 2
-TRUE

FILETYPE FIRM 1000) FILE CLASSIFICATION FILE TO BE USED TO HOLD NO DATA
FILETYPE FIRM 1000) TEMPORARY FILE
FILETYPE FIRM 1000) FILE TO BE USED TO HOLD NO DATA
FILETYPE FIRM 1000) FILE TO BE USED TO HOLD NO DATA

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```
* RECALL INFORMATION FOR FILEOFF
*
* LOAD CLSHCL (CLEAR OUTLINE SHEET)
*
* LOAD ESEC TO FILEOFF CLASS FILE
* EXEC CLASHCL D
* READ VAN'S EFWW
* IF CLERR GO TO EXIT 3
*
* LOAD PROGRAM
*
* LOAD UNIV4VECLCLFAR 40m12 Start
* EXIT 4
```

REQUESTED OPTIONS: NONE

OPTIONS IN EFFECT: NAME(MAN) OPTIMIZE(1) LINECOUNT(40) SIZE(MAX) AUTOEND(MORE) SOURCE FORTIC (NONE) CHECK OBJECT MAP NORM-AT (JUSTIFY) AREA ALC NUNANSI NOTERM IBM FLAG(1)

PROGRAM CLSPEC READ FILE 1110 FOR UNIVREC FILE.

HISTORY

M A THOMPSON LKSCD 05/26/81 FILECALL (ORTS CODE)
C A STEVENS LKSCD 05/26/81 CODE

METHOD

READ FROM RECALL FILE 23 FOR CLASSIFICATION FILE INFO;
IF FILE IS EMPTY WRITE AN EXEC WITH THE ERROR FLAG SET TO
13 ELSE; WRITE EXEC TO FILE THE CLASS FILE; THIS IS NECESSARY
ONLY BECAUSE OF THE POSSIBILITY OF THE FILE DELETION BEING
LOST OF A SYSTEM ERROR ON ONE OF THE PROGRAM EXECUTIONS.

EXTERNAL REFERENCES

NONE.

EXCEPTIONS

1. IF RECALL FILE IS EMPTY ISSUE DIAGNOSTIC MSG AND WRITE
ERROR EXEC.

LOCAL DECLARATIONS

INTEGER JUNIT UNIT FOR GROUPED TRUTH -- 10
INTEGER NMPC(12) CLASS FILE NAME
INTEGER NMCT(12) CLASS FILE TYPE
INTEGER ADDRCL CLASS FILE MODE

PROCEDURE

START JUNIT, RECALL EXEC

WRITE (2,300)
FOR FORTIC (1,2,3,4,5,6,7,8,9,10,11,12)

READ FROM RECALL FILE FOR CLASSIFICATION DATA

400 JUNIT = 0
IF NMPC(1) = 0
NMCT(1) = 1
NMCT(2) = 2
NMCT(3) = 3
NMCT(4) = 4
NMCT(5) = 5
NMCT(6) = 6
NMCT(7) = 7
NMCT(8) = 8
NMCT(9) = 9
NMCT(10) = 10
NMCT(11) = 11
NMCT(12) = 12

WRITE EXEC

430 0.10 (2,300)

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APPENDIX C
OUTPUT LISTING

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RJN
DEFCLAS 0123 CONF M
DEV 192 DMS NOT EXIST
DMLINK 192 TERN 151 NOT LINKED P/W BY VAMMINT
192 HAS BEEN ATTACHED AS 192. 1003.00 MEGABYTES
EXECUTION 192...
01000041N
UNIV4VFC 0123 TERN

UNIV4VFC 0123 TERN
DMSD 192 130 MEGABYTES P/W 15 CY
EXECUTION 192...
EXECUTION 192...

THE ACTUAL NO OF LINES PROCESSED = 118 FOR SEGMENT NUMBER 123
R1000041N
END